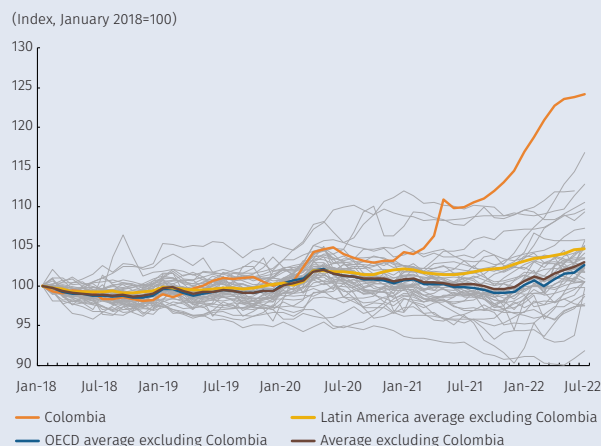


Box 1: Food inflation: a comparison with other countries

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Graph B1.1
Relative food price index



Note: The gray lines represent the other OECD countries and Latin America.
Sources: OECD and ECLAC; own calculations.

Since last year, high increases in food prices have been observed worldwide. This phenomenon has been more intense in Colombia than in other Latin American countries and other member countries of the Organization for Economic Cooperation and Development (OECD). Between May 2021 and July 2022, food prices in Colombia have shown an average annual growth of 17%, which is 12 percentage points (pp) higher than the average for other member countries of the OECD and 7pp higher than in the average for other Latin American countries. This box studies the causes of these differences. First, through an econometric exercise, it shows that persistent effects of the roadblocks during the 2021 national strike might explain around 9pp of the total food inflation gap between Colombia and other comparable countries. Then, it describes the case of post-strike egg and potato production in the country. These two examples present evidence of the persistent effects of roadblocks on the food supply in Colombia, and they illustrate the mechanisms by which the roadblocks could have triggered persistent food price increases in the country.

Food prices worldwide have been exposed to heavy pressures related to high input prices and the recovery of global demand. Although these factors affect all countries similarly, Graph B1.1 shows that, starting in May 2021, relative food prices in Colombia have risen more than in other Latin American and OECD countries.¹ The coincidence of the moment when roadblocks began during the national strike, on 28 April 2021, and of the widening of the food inflation gap between Colombia and other countries, on May 2021, suggests that the strike could be one of the causes of this behavior. Hereunder, the technical staff presents an econometric exercise that offers information on this correlation and the possible effects of the strike on the widening of the food inflation gap between Colombia and other countries.

1. Effect of the 2021 roadblocks on the gap for food inflation between Colombia and other countries.

Specification of event study

An event study methodology is used to estimate the effect of the 2021 roadblocks on food inflation differences between Colombia and a group of countries which includes the rest of Latin America and other OECD member countries. This methodology allows the study to measure changes in the inflation gap between Colombia, and the average for the other countries after the strike, isolating the effect of

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1 This index is calculated dividing the food CPI by the total CPI, both index values are normalized based on January 2018 values.

global shocks, such as the war between Russia and Ukraine, and the effect of each country's specific factors, such as weather and the depreciation of exchange rates. Equation (1) presents the econometric specification estimated by this methodology:

$$\widetilde{P}_{ct} = \mu_c + \gamma_t + \sum_{j=-10, j \neq -1}^{14} \beta_j 1\{t-K=j\} G_c + \beta_{-11} 1\{t-K \leq -11\} G_c + X_{ct}' \Gamma + \epsilon_{ct}, \quad (1)$$

\widetilde{P}_{ct} is total food inflation in country c for month t ; μ_c and γ_t are country and time fixed effects, respectively; K represents the first month after the strike began (May 2021); G_c is a dichotomous variable that takes the value of 1 for Colombia and 0 for other countries (the control group), and X_{ct}' includes control variables for country and month. These variables, explained further ahead, include measurements of rainfall excess and scarcity, the depreciation of currencies, and time fixed effects that interact with the relative weight of inputs and food exports and imports in each country, among others.

The country fixed effects allow the method to control for country-specific characteristics that do not vary over time, and which explain permanent differences in its inflation levels, such as monetary and exchange policy regimes. The time fixed effects capture inflation shocks that happen at given periods and which affect all countries equally, for instance increases in international supplies prices and logistic problems in global supply chains.

β_j coefficients are the parameters of interest. These coefficients capture the change in the inflation gap between Colombia and the control group's average in relation to the gap before the strike. April 2021 is used as a reference. Thus, these coefficients capture the change in the inflation gap between Colombia and the control group's average j months after the strike began² in comparison with the gap registered in April 2021.

The change in the inflation gap between Colombia and the control group, starting from May 2021, captures the effect of the strike on food inflation in the country if two conditions are met: first, whether food inflation in Colombia followed a similar trend to that of other control group countries before the strike³; and second, whether no different events or factors which affected food inflation happened in Colombia versus the control group after May 2021. The first condition implies coefficients $\beta_j = 0$ for the months before the strike, which can be verified empirically with the estimate derived from equation (1). The second condition is not directly verifiable. However, as is demonstrated further ahead, the stability of the coefficients estimated after including control variables that capture events relevant to food inflation in the sample's countries, suggests that the estimated coefficients cannot be explained by these factors and seem to be related to the strike's persistent effects on food prices in Colombia.

Results

The study uses data from January 2012 until July 2022 to estimate equation (1). Graph B1.2 presents these β_j estimates with their respective confidence intervals at 95%. The graph shows that it is not possible to reject the null hypothesis of the coefficients β_j being equal to zero for the months prior to the strike ($j < 0$). This means that, until April 2021, the gap for total food inflation between Colombia and the average for the control group followed a similar trend, having values that were not statistically different from the gap observed in April 2021.⁴ In May 2021, this gap grew 6 pp due to a rise in food prices in Colombia that persisted and even accelerated at the beginning of 2022.

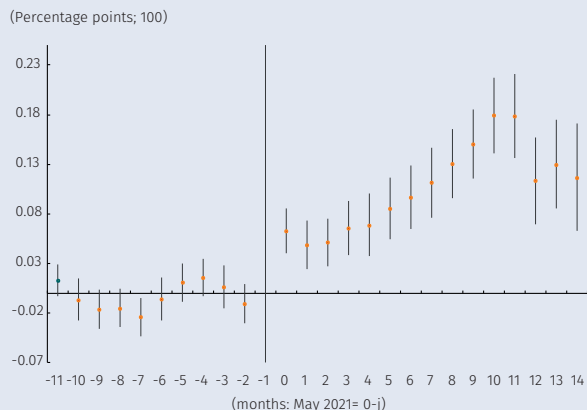
Table B1.1 shows the estimates for a difference-in-differences model that captures the average of the estimated coefficients β_j since May 2021. These estimates represent the average increase in the inflation gap between Colombia and the

2 Sub-index j represents time in relation to the start of the strike (May 2021); $j > 0$ represents periods of time after the strike began, and $j < 0$ represents periods of time prior to it.

3 This assumption is equivalent to the parallel trends assumption in a difference-in-differences design.

4 In April 2021, food inflation in Colombia was 3.9%, and the average for the control group was 2.5%. The control group includes Argentina, Austria, Belgium, Bolivia, Brazil, Canada, Chile, Costa Rica, the Czech Republic, Denmark, Ecuador, El Salvador, Estonia, Finland, France, Germany, Greece, Guatemala, Honduras, Hungary, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, Nicaragua, Norway, Panama, Paraguay, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, the United Kingdom, and Uruguay.

Graph B1.2
Results of event study estimates



Note: The chart shows the estimated coefficients β_j from equation 1. Control variables include: annual changes in the contemporary and 12 lagged exchange rate, time fixed effects interacted with categorical effects according to the weight of food exports and imports, input imports from around the world and from Russia and Ukraine, and food import tariffs. The coefficient β_{-11} groups the months prior to May 2020.

Sources: OECD, ECLAC, Banco de la República de Colombia, Banco Central de Honduras, Banco Central de Nicaragua, Banco Central del Paraguay, Banco Central de Bolivia, WITS-World Bank; authors' calculations.

Box: B1.1
Results of difference-in-difference regressions

	(1)	(2)	(3)	(4)
COL =1x After the strike=1	0.0915*** (0.009)	0.0942*** (0.011)	0.0830*** (0.009)	0.0943*** (0.010)
Shock shortage of rainfall				0.0501*** (0.012)
Shock excess rainfall				-0.020 (0.015)
R2	0.687	0.815	0.529	0.813
Observations	5614	5614	1188	1188
Countries	45	45	10	10
Period	2012-2022	2012-2022	2012- 2022	2012- 2022
Exchange rate		X		X
Export and import of food		X		X
Tariffs		X		X
Inputs Russia and Ukraine		X		X

Robust errors in parentheses * p<0.10; ** p<0.05; *** p<0.01 Note: control group countries in columns (1) and (2) are Argentina, Austria, Belgium, Bolivia, Brazil, Canada, Chile, Costa Rica, Czech Republic, Denmark, Ecuador, El Salvador, Estonia, Finland, France, Germany, Greece, Guatemala, Honduras, Hungary, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, Netherlands, Nicaragua, Norway, Panama, Paraguay, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, United Kingdom, United States and Uruguay. The control group countries in columns (3) and (4) are Brazil, Chile, Costa Rica, Guatemala, Honduras, Mexico, Nicaragua, Paraguay and Uruguay.
Source: authors' calculations.

control group after the strike.⁵ Column (1) shows the estimate's results only with fixed country and time effects. Column (2) includes control variables that capture differences between countries in exposure to international shocks, which might explain differences in the evolution of food prices.

In particular, annual changes in each country's exchange rates are included⁶, in addition to time fixed effects that interact with measurements of the relative weight of food imports and exports⁷, exposure to supplies imports from Russia and Ukraine, and a measurement of the degree of tariff protection for each country's food industry. These interactions capture the possibility of international price shocks affecting countries differentially, according to their exposure to international food and supplies markets. The results show that the estimated coefficient is similar in magnitude to the coefficient calculated before including these controls and suggest that neither the exchange rate nor the differential effect of international shocks, according to each country's degree of exposure, can explain the inflation gap observed between Colombia and the control group after May 2021.

Columns (3) and (4) show the results when the control group is limited to a group of non-dollarized Latin American countries with flexible exchange rates⁸. Column (4) includes, as an additional control, measurements of precipitation excess and scarcity in these countries⁹. Once more, it can be observed that the strike's estimated effect is stable among the specifications. According to these results, excess rain caused by the recent *La Niña* phenomenon cannot explain the inflation gap between Colombia and the Latin American countries included in the analysis. While rain has partially affected agricultural production in Colombia, *La Niña* also affects other countries in the region through heavy droughts that also have negative effects on food production. Therefore, this phenomenon is insufficient for explaining the rise in food prices in Colombia relative to other countries.

In further exercises, measurements of meat and livestock exports and the unemployment rate are included as controls, with results similar to those obtained before including these variables. This indicates that neither the behavior of meat exports, nor a quicker reactivation of demand given recovery in

5 This average is estimated by means of a difference-in-differences method $P_{it} = \mu_c + \gamma_i + \beta G_c \times 1\{t \leq K\} + X_{it} \Gamma + \epsilon_{it}$, where the coefficient β captures the average difference for food inflation between Colombia and the control group countries after May 2021 and up until July 2022.

6 In order to take into account the lagging effects of exchange rate depreciation on inflation, each country's annual devaluation is included as a control in period t and twelve more time lags ($t, t-1, \dots, t-12$).

7 In order to create this measurement, the average weight of food imports and exports against total food and of supplies imports in proportion of each country's GDP between 2010 and 2019 is calculated. Then, dichotomous variables are generated that indicate whether each country shows a proportion of the respective variable above the sample's median.

8 These countries are Brazil, Chile, Costa Rica, Guatemala, Honduras, Mexico, Nicaragua, Paraguay and Uruguay.

9 These measures are calculated based on monthly precipitation maps from the Copernicus Climate Change Service. Information gathered since 1979 is used to calculate rainfall excess and scarcity shocks for each subnational region. A rainfall excess shock is considered to have occurred during a certain month when precipitation levels reach the 80th percentile in historical distribution for that month in the respective region. Likewise, a scarcity shock corresponds to a precipitation level below the 20th percentile. The regression includes a shock cumulative value for each country between months t and $t-6$.

employment can explain the differences observed in inflation between Colombia and the other countries analyzed.

In summary, the results show that roadblocks during the 2021 national strike are related to an average gap of 9 pp between food inflation in Colombia and in the study's different control groups. This increase in food inflation as of May 2021 could explain an average of 1.7 pp of the headline inflation observed in Colombia since then¹⁰. The event study's coefficients show a rise in Colombia's food prices which occurred immediately after the start of the strike and which has persisted until the latest available data, from July 2022. Next, some of the mechanisms through which the strike could have generated persistent effects on food prices will be discussed.

2. Systems: the effect of roadblocks on food production

The roadblocks, which lasted approximately two months, prevented access to and from some of the country's cities and productive regions, especially in the southwest. This affected food supply and generated an immediate increase in prices. Additionally, it hurt the incomes of producers that were not able to sell their harvests or access agricultural supplies, thus restricting fertilization labors and weed control. This had persistent effects on production. Next, two examples that illustrate these effects are presented.

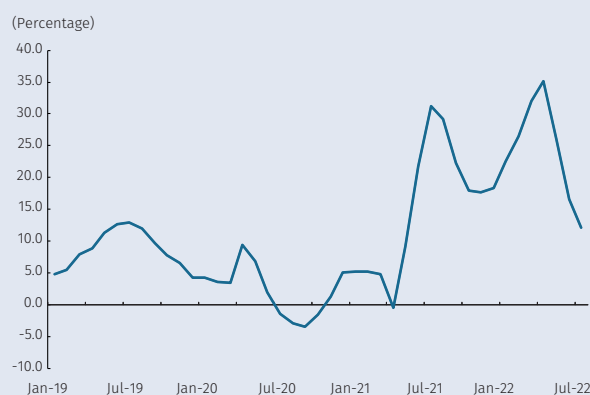
Eggs

Graph B1.3 shows an average annual CPI growth of 23% for eggs since May 2021. This increase contrasts with the behavior prior to the strike and coincides with deceleration in production and chick hatchery in the country (Graph B1.4)¹¹. Up until April 2021, egg production grew at an average annual rate of 12%. Starting in May 2021, production growth decelerated, falling to average levels of -1%. According to information from producers roadblocks prevented access to food for birds in the southwest, where approximately 30% of the country's poultry production is concentrated. This food reduction affected birds' development, impacting egg and laying bird production. These effects would take two years to dissipate. The recovery of production has also been affected by the persistence of high supply costs. This can be seen in a placement that still has not regained its levels prior to the roadblocks. A similar phenomenon appeared in the case of chicken and pork production, with less persistent effects given shorter production cycles. According to informants from this sector, these effects dissipated during the second semester of 2021.

Potatoes

Graph B1.5 shows the annual change in potato prices and supply in the country. In May 2021, a 10% fall in national potato supply can be seen, which can be explained by a contraction of supply

Graph B1.3
Egg CPI variation
(YOY)

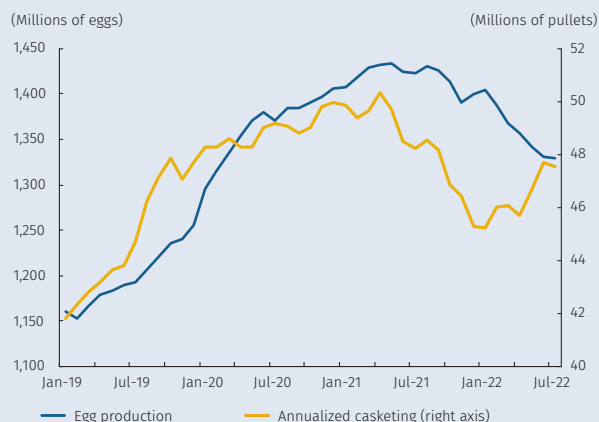


Source: DANE; authors' calculations.

¹⁰ For the purposes of this exercise, a counterfactual food inflation is calculated by subtracting the difference calculated in Graph B1.3 from observed food inflation. Total inflation is calculated as the weighted sum between observed inflation excluding foods and the counterfactual food inflation. For this weighted sum, the DANE's weightings are used for each segment in the most recent methodological modification, from 2018.

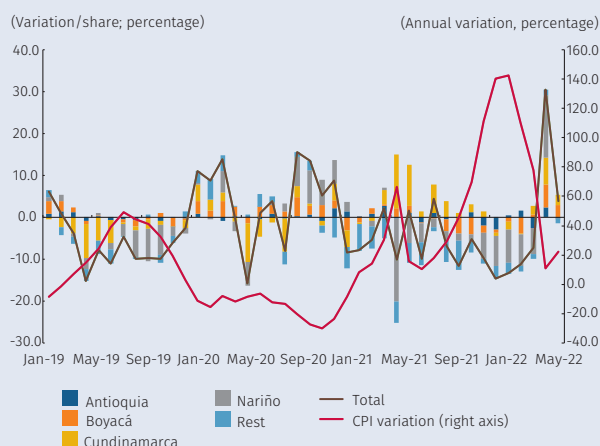
¹¹ Annualized placement corresponds to the sum of twelve months of monthly chick placement.

Graph B1.4
Egg production and casketing



Source: Fenavi; authors' calculations.

Graph B1.5
Potato supply



Source: DANE-SIPSA; authors' calculations.

from Nariño, where roadblocks prevented the transportation of harvests to the rest of the country¹². The fall in producer incomes in this region, who like the rest of the country had been exposed to increases in supplies costs and, in some regions, excess rainfall, deteriorated financial conditions for planting. These lower amounts of re-planting diminished tuber supply, which produced an increase in prices during the first months of 2022.

Conclusions

The data indicate that the May 2021 strike coincided with a significant rise in food prices in Colombia. This phenomenon was more pronounced than in other comparable countries and cannot be explained by other factors, such as excess rainfall, exchange rate depreciation, or some indicators of international trade. Although it is not possible to completely reject that other specific factors of the local economy might explain part of the differences between Colombia and other countries, the disturbance caused by the roadblocks to the production cycles of important foods in the market basket, such as eggs and potatoes, indicates that the strike could be a relevant factor in explaining these differences. These disturbances may have boosted pressures on the supply of input price increases. And, along with dynamism in demand, they might have triggered the observed price increases. It is expected that the pressures caused by the strike have already begun to dissipate and that the inflation gap between Colombia and other countries narrows in the following months, as production cycles stabilize.

12 See: "¿Cuáles son las razones por las que la papa ha subido más de 110 % en el último año?" (agronegocios.co)